

Programming 2 Tutorial 4

This week's tutorial session is about extending the object scenario begun last week, and making use of advanced object-oriented design to model it in the best manner.

The Scenario

The courier company now aims to extend (and re-work if necessary) its fleet maintenance tracking system, by allowing it to also keep information about their freighter aircraft, in addition to its van and truck fleet. Despite the now diverse range of transportation modes, the system should still operate in a manner identical to that introduced in the previous week.

Aircraft

An aircraft has a registration (for identification), and a year, make and model. The maintenance schedule, however, is significantly different. Instead of using the distance travelled as a service indicator, an aircraft requires maintenance after a certain number of flights, *or* after a certain number of flying hours. Like in the case of vehicles, the maintenance schedule should be protected from being modified arbitrarily.

As the system works with distance and not time, flying hours are estimated by dividing the distance travelled for a job by dividing the distance against a pre-determined average speed for the craft. (This average speed figure is modifiable.)

An aircraft is considered unsuitable for work if *either* the flight count, *or* the flying hour count exceeds the service interval.

An aircraft's wear and tear estimate can be calculated as \$30,000 + \$5 per kilometre travelled.

Tutorial Session

Discuss with your peers (and staff member/s) how your design from last week can be modified for the newer, more diverse scenario. Consider all of the approaches that may help; and discuss all those that sound feasible. In particular, how might abstract classes and/or interfaces help?

Points to consider: *(not an exhaustive list)*

- Abstracting the concept of the transport mode, rather than a particular type of transport: in the context of this scenario, what is the critical functionality?
- How much of your existing design (from last week) is still relevant?
- How can vans, trucks and aircraft elegantly co-exist?
- Extensibility: the system has had to be extended once, it's likely it will need to again. What design decisions can be made to promote future extensibility?
- Should an aircraft object store its usage in distance, or flying hours? Or both?
- Will the two-step serviceability requirement of an aircraft impact the greater design? Why (or why not)?
- How will this affect the testing procedures worked out last week? How many more tests will be necessary? Are some no longer relevant?